

	Autumn Term	Spring Term	Summer Term
Year 12	<p>Curriculum and Skills: This term introduces the basic chemical concepts and practical techniques that underpin all further work at A level.</p> <p>Topics covered:</p> <ul style="list-style-type: none"> • Atomic structure • Quantitative chemistry: • Formulae, equations, amount of substance and the mole • Reactions of acids • Oxidation number and redox reactions • Bonding and structure. • Basic concepts in organic chemistry • Hydrocarbons <p>Practical work: Moles determination: PAG 1.2 Determination of the RAM of Magnesium PAG 1.3 Determination of the formula of Magnesium oxide Acid–base titration: PAG 2.1 Determination of the concentration of hydrochloric acid PAG 2.2 Determination of the molar mass of an acid Research skills: PAG 12.1 Investigating iron tablets</p>	<p>Curriculum and Skills: The periodic table is explored in detail looking at trends in physical and chemical properties and then looking in detail and the chemistry of group 2 and group 7. In organic chemistry the properties and reactions of alcohols and haloalkanes are explored, concepts of reaction mechanisms are introduced, and students use techniques in practical synthesis of organic liquids and in term 2 organic solids.</p> <p>Topics covered:</p> <ul style="list-style-type: none"> • The periodic table and periodicity • Group 2 and the halogens • Qualitative analysis • Alcohols and haloalkanes <p>Practical work: Qualitative analysis of ions: PAG 4.2 Identifying unknowns 2 Synthesis of an organic liquid: PAG 5.1 Synthesis of a haloalkane OR PAG 5.3 Oxidation of an alcohol</p>	<p>Curriculum and Skills: <i>(Some of this content may be started in term 2 if time permits)</i> This term we study Physical chemistry related to energy changes. Students quantitatively measure energy changes of reaction and use Hess law to predict energy changes. Students' knowledge of the way temperature and catalysts change the rate of a reaction is extended by introduction of the Boltzmann distribution. The factors that effect the extent of a chemical reaction are explored in the topic equilibrium and GCSE knowledge is extended by the introducing quantitative analysis in the form of the equilibrium constants Kp and Kc. In organic chemistry instrumental analytical techniques are explored such as IR, UV and NMR to provide evidence of structural features in molecules. Organic synthesis is continued from term2 and extended to the synthesis of an organic solid (aspirin)</p> <p>Topics covered:</p> <ul style="list-style-type: none"> • Enthalpy changes • Reaction rates and the Boltzmann distribution • Chemical equilibrium and Kc and Kp • Organic synthesis • Analytical techniques (IR and MS) <p>Practical work: Enthalpy determination: PAG 3.1 Determination of the enthalpy change of neutralisation PAG 3.3 Determination of the enthalpy change of combustion PAG 3.2 Determination of the enthalpy change of reaction by Hess' law Synthesis of an organic solid: PAG 6.1 synthesis of aspirin Research skills: PAG 12.2 Investigating the copper content of brass screws PAG 12.4 Chemistry research project (Centre designed)</p>
	<p>Assessment: Transition test Autumn half term test Christmas test</p>	<p>Assessment: Jan Mock exam Spring term test</p>	<p>Assessment: Summer half term test Summer Mock exam</p>

Year 13

Curriculum and Skills:

Physical Chemistry: A quantitative analysis of the rate of chemical reactions is introduced to extend the qualitative understanding introduced at GCSE and year 12. The quantitative analysis of chemical equilibrium introduced in year 12 is used to quantify pH acids and buffer mixtures.

Topics covered include:

- Reaction rates and equilibrium (quantitative)
- Acids, bases and buffers

Practical work:

Rates of reaction – continuous monitoring method:

PAG 9.2 The rate of reaction between calcium carbonate and hydrochloric acid

Rates of reaction – initial rates method:

PAG 10.2 Thiosulfate and acid

PAG 10.3 Rates activation energy

pH measurement:

PAG 11.2 pH - titration curves

PAG 11.3 pH – acids and buffers

Organic Chemistry: The study of organic chemistry continues from year 12 - Several new functional groups are introduced, and the work emphasises the importance of organic synthesis and chemical tests used to identify organic compounds.

Topics covered include:

- Aromatic compounds
- Carbonyl compounds
- Carboxylic acids and esters

Practical work:

Identifying organic unknowns:

PAG 7.3 Identifying organic unknowns 3

Assessment:

Autumn half term test
Christmas test

Curriculum and Skills:

Physical Chemistry: The physical chemistry this term builds upon the concepts of energy changes introduced in year 12.

Topics covered include:

- Enthalpy, entropy and free energy
- Redox and electrode potentials

Practical work:

Electrochemical cells:

PAG 8.1 Electrochemical cells 1

PAG 8.2 Electrochemical cells 2

Inorganic chemistry: Transition metals are the focus of the inorganic chemistry taught this term and related to the concepts of oxidation states introduced in year 12.

Topics covered include:

- Transition metals

Organic chemistry: More new functional groups are introduced focusing on nitrogen containing compounds and the reactions that form polymers. A important emphasis of the work this term is to combine all the organic reactions studied into a synthesis map to allow planning and prediction of synthetic pathways to create new organic molecules. In addition, the analytical organic techniques from year 12 are revised and extended

Topics covered include:

- Nitrogen compounds
- Polymers
- Organic synthesis
- Chromatography and spectroscopy (NMR)

ONGOING THIS TERM: Practical Work catch up and PAG revision

Assessment:

Jan Mock exam (Paper 2 mock)
Half term test
Easter test

Curriculum and Skills:

Revision in preparation for final exams

Assessment:

Paper 1 Mock
Paper 3 Mock